

this materially increased in the ascent to the highest point attained. The commissariat, in Dr. Workman's opinion, is a most important factor for success in reaching great elevations, since he holds dyspepsia and imperfect nutrition responsible for the distressing symptoms experienced by some of his predecessors. Food should be rather light, but nutritious. He makes some valuable remarks on the best kinds, stating that he thinks alcohol beneficial if it be taken in very moderate quantities and at meal times; warm wraps also are most important. In fact, his careful discussion of the subject is a valuable supplement to what has been already published, and proves that climbers anxious to reach the highest summits of Asia must possess either the *dura messorum ilia* or the purse which can bear the very heavy cost of a well-equipped expedition.

T. G. BONNEY.

THE ROYAL INDIAN ENGINEERING COLLEGE.

FROM letters which have been published recently in the *Times* and other journals, we have become aware of the following facts relating to the Royal Indian Engineering College, Coopers Hill:—

(1) The Secretary of State for India, acting on certain suggestions, made to him ostensibly by the Board of Visitors of the College, for remodelling the course of instruction on a very extensive scale, decided, some considerable time back, that it was necessary to dismiss *half the educational staff* of the College for the purpose of "reducing the present excessive cost of the staff and increasing the efficiency of the teaching."

(2) No hint that this momentous change was coming was conveyed to any of the seven gentlemen concerned, who received their first intimation on the 17th of last month from the President of the College, Colonel J. W. Ottley, in a letter of singular abruptness, heartlessness and irony. This letter, addressed to each of the seven gentlemen, was as follows:

"Sir, I have the honour to forward for your information a copy of a letter, P.W. 2531, dated 14th inst., from which you will see that I am instructed to convey to you the decision of the Secretary of State for India in Council that you will be required to vacate your appointment at this College at the end of the next Easter term.

"I have the honour to be, Sir, your obedient servant,

"JOHN W. OTTLEY, President, R.I.E.C."

The seven gentlemen to whom this communication was made are Mr. T. A. Hearson, M.Inst.C.E., Professor of Hydraulic Engineering, &c.; Mr. H. McLeod, F.R.S., Professor of Chemistry; Mr. W. N. Stocker, M.A., Professor of Physics; Mr. A. H. Heath, Assoc.M.Inst.C.E., Assistant Professor of Engineering; Mr. T. Shields, M.A., Demonstrator in Physics; Mr. P. Reilly, Demonstrator, Mechanical Laboratory; Mr. J. C. Hurst, Lecturer in Accounts.

With reference to the first of these facts we may affirm with confidence that the drastic changes—which involve serious curtailments of the branches of engineering and chemistry, and, apparently, the total abolition of physics and electrical engineering—are not to be attributed to the Board of Visitors. It is not credible that these gentlemen—very busy men as some of them are—can have devoted so much time and study to the educational course of the College as to justify their taking the responsibility of advising the Secretary of State for India to effect such extensive changes. We are compelled to adopt the conclusion that Colonel Ottley (whose name appears for the first time in the College Calendar for 1899–1900) himself is the real author. If this is so, we are further compelled to inquire into Colonel Ottley's qualifications as an educationist and a man of science. We are not acquainted with any scientific treatises or papers of his authorship, nor are we aware that he was selected as the head of a scientific college because of any experience as a lecturer on scientific subjects. His predecessors at the College have been, we believe, like himself, officers of Royal Engineers; but, apparently, they were wise enough to keep their theoretical autocracy as presidents within the limits prescribed by common sense.

From the memorial addressed by the dismissed members of the staff to the Secretary of State we infer that Colonel Ottley

interprets his autocracy very literally, and is disposed to take no advice from the educational staff on matters of which they must necessarily know vastly more than he; and if so, it ought to be abundantly clear to the India Office that Coopers Hill College must be, as an educational institution, a complete failure.

It will be observed that the subjects which are most affected by the change—chemistry, physics and the mechanical laboratory—are those in which practical work has an important place; it is well known to those experienced in scientific education that this practical work is of the greatest value in developing in students the scientific spirit which is so essential to success in such a profession as engineering. We believe that the laboratories at Coopers Hill were enlarged some years ago and the staff increased, so that every student should have instruction in the chemical, physical and mechanical laboratories, on the recommendation of the Board of Visitors; but at that time one of the members of the Board was Sir William Siemens, who, knowing the result of practical work in the German universities upon industries and professions, considered its further development at Coopers Hill to be of importance. The present action appears to be in direct opposition to the former recommendations of the Board of Visitors.

Turning our attention next to the second of the above facts, we are compelled to express not only astonishment but indignation that such heartless brutality should have been possible in England. To know that seven gentlemen—two of them members of the Institution of Civil Engineers and another a Fellow of the Royal Society—are to receive a three months' notice of dismissal, timed, as it would seem, by the clock; to know that it must be of the utmost importance to them to be warned of the impending catastrophe so that they may have opportunities for seeking other work; and yet to keep their sentence a dead secret until the last available moment, constitutes a condition of mind which, we hope, is very rare among Englishmen.

The cause of Coopers Hill College is, in this matter, the cause of education at large. All that the dismissed members of the staff have asked from the India Office is that an independent committee of experts in scientific engineering, education, and college management should be appointed to inquire into the way in which the College is managed.

But we go beyond this request. We would make an appeal to men of science and of learning to make, either by deputation or by memorial, a representation to the India Office of the widespread feeling of disapproval with which this official action, for which the Secretary of State for India is responsible, is regarded, and of the desirability of ensuring to the educational staff of the College at Coopers Hill such influence in educational matters as is accorded in every College in the Kingdom.

NOTES.

PROF. STRASBURGER has been elected a correspondant of the Paris Academy of Sciences, in the section of botany.

THE death is announced of Dr. Potain, professor of medicine in the University of Paris, and member of the section of medicine and surgery of the Paris Academy of Sciences.

It is announced by *Science* that Prof. W. W. Campbell has been appointed director of the Lick Observatory, in succession to the late Prof. J. E. Keeler.

At a special meeting of the Metropolitan District Railway Company on Monday, it was resolved that capital should be raised for the purpose of adapting the line to electric traction. This action has been forced upon the company by the diversion of traffic to the Central Electric Railway, and omnibus competition.

WE regret to announce the death of Dr. G. Pacher, of Padua University, on December 29, at the age of thirty-three. We owe to him some valuable studies of the records of the Vicentini microseismograph, and also the application of the pantagraph to that instrument.

THE Board of Trade have appointed a committee consisting of Lord Rayleigh, F.R.S., chairman, Sir John Wolfe-Barry, K.C.B., F.R.S., and Prof. Ewing, F.R.S., to consider to what

extent the working of the traffic on the Central London Railway produces vibration in the adjacent buildings, and what alterations in the conditions of such working or in structure can be devised to remedy the same.

THE dispute between Kew Observatory and the London United Tramways Company still occupies public attention. Mr. R. T. Glazebrook, in a letter to the *Times*, gives an answer to the argument brought forward by the Tramways Company that the current leaking into their lines, presumably from the Central London Railway, should have already vitiated the magnetic observations made at Kew. He points out that the observations have not been appreciably affected, and that from theoretical considerations it was not to be expected that they would be. The disturbances that the London United Tramways Company are likely to produce will be about a hundred times as serious. Mr. Glazebrook has given a proof of this in a letter to the *Electrician*. A letter to the *Times* from Mr. Walter Hunter points out that the leakage currents from the tramway lines are a serious danger to gas and water pipes, and that the amount of harm done is merely a question of time. Perhaps it is too much to expect the Tramways Company to consider any but their own interests; it is to be hoped, however, that they will be brought to see that it is really to their own interest to insulate their return mains. There is no difficulty in doing so, and sooner or later it will have to be done. We notice that American experience shows that the only way to avoid electrolysis of the pipes is to keep the return currents out of the ground, and also that an experience from ten years running of over 200 miles of track shows that the double trolley system—which the London United Tramways Company consider impracticable—is cheaper in operation and maintenance than the single trolley system.

THE annual general meeting of the Royal Meteorological Society will be held on Wednesday, January 16, when the president, Dr. C. Theodore Williams, will deliver an address on "The Climate of Norway and its Factors."

THE *British Medical Journal* states that the Astley Cooper triennial prize of 300*l.* will be awarded for the best essay or treatise on "The Pathology of Carcinoma and the Distribution and Frequency of the Secondary Deposits corresponding to the Various Primary Growths." The essay, which is to be written in English, must reach Guy's Hospital, addressed to the physicians and surgeons, on or before January, 1904.

COL. A. T. FRASER sends us a copy of the *Indépendance Belge* to direct our attention to a matter brought before the last meeting of the Brussels Academy of Sciences. From the report we see that M. Charles Lagrange, director of the Royal Observatory, has resigned his office and has presented to the Academy his two years' arrears of salary, or a capital sum of ten thousand francs, to establish a prize to be awarded, at intervals of four years, for the best contribution to our knowledge of the physics of the globe. In expressing the thanks of the Academy for the gift, General Brialmont described the circumstances which led to M. Lagrange's resignation. It appears that for the past two years the position of director of the Observatory has been a humiliating one, because a young infantry officer without scientific attainments has controlled the establishment.

WE regret to announce the death of Mr. F. W. Egan, B.A., of the Geological Survey of Ireland, which took place at his residence in Dublin on January 6. After some experience as a civil engineer, he joined the Geological Survey under Jukes in 1868, and has ever since that date been actively engaged in the field-work of the service. For the last few years he devoted himself to the revision of the Silurian system in the east of Ireland, and separated the Lower from the Upper division over a large part of that region. Eighteen months ago, during

a tour of inspection in County Wicklow, the Director-General of the Survey, with Messrs. Egan and McHenry, were thrown from an Irish car. Though each of the party sustained more or less injury, Mr. Egan fared worst. He had his shoulder dislocated, and suffered also some internal injury, so that he never regained his former strength, though he went through the field-campaign last year. Last week, symptoms of a grave kind began to show themselves, and he passed away on Sunday evening. Quiet, gentle and kindly, and not without a touch of humour, he was everywhere a favourite, and though he never had any ambition to distinguish himself, his long years of steady and patient devotion to his official duties enabled him to do good service to the cause of geology in Ireland.

THE Berlin correspondent of the *Times* announces that the German Emperor has conferred the Order of the Red Eagle, First Class, upon Lieutenant-General Count von Zeppelin, as a recognition of his efforts to overcome the difficulties of aerial navigation. The announcement of this distinction was made to Count von Zeppelin by the following letter from the Emperor, which was conveyed to him by General von Hahnke, the chief of the Emperor's Military Cabinet, before the beginning of a lecture upon the "Future of Aerial Navigation," delivered by the aeronaut at a meeting of the Berlin branch of the German Colonial Society:—"Having been informed of the ascents which have been made in the air-ship which you have invented, I am glad to express my appreciation of your persistence and trouble in successfully carrying out your self-imposed task, in spite of the manifold difficulties which it presented. The advantages of your system—the division of the long, extended balloon into compartments, the equal distribution of the burden by means of two independent engines, and a rudder working with success for the first time in a vertical direction—have enabled your air-ship to move with the greatest speed which has hitherto been attained and have rendered it amenable to the rudder. The results which you have achieved constitute an epoch-making step in advance in the construction of air-ships, and form a valuable basis for further experiments with the existing material. I will support you in these further experiments by placing the advice and the experience of the Balloon Division of the army at your disposal whenever you may desire. I have accordingly given orders to the Balloon Division to send an officer to be present at your future experiments whenever it may be of advantage. As an outward sign of my recognition I hereby confer upon you the Order of the Red Eagle, First Class."

THE annual general meeting of the Institution of Mechanical Engineers will be held on Friday evening, January 18, when the chair will be taken by the president, Sir William H. White, K.C.B., F.R.S. The first presentation by the Institution of the Willans Premium will be made to Capt. H. Riall Sankey; and the prizes awarded by the Council for the best two papers in the graduates section will be presented to Mr. W. B. Cleverly and Mr. Brees van Homan. The adjourned discussion will be resumed upon the paper on power-gas and large gas-engines for central stations, by Mr. Herbert A. Humphrey, read at the December meeting. At the graduates' meeting, to be held on Monday, January 14, Prof. J. A. Ewing, F.R.S., will deliver a lecture at the Institution on "The Structure of Metals," illustrated by lantern slides.

ENTOMOLOGY has sustained a serious loss in the death of Mr. John Henry Leech, which occurred on December 29, at the early age of thirty-eight. Mr. Leech, who had one residence at Hurdcott House, Salisbury, and a second at Kippure Manor, Kilbride, Dublin, was the eldest son of the late Mr. John Leech, of Gorse Hall, Cheshire, and was a graduate of Cambridge. In addition to being proprietor of the *Entomologist*, he was author of "The Butterflies of China, Japan and

Corea," a work for which he accumulated a large collection (part of which is now in the Natural History Museum) during his travels in the countries mentioned. If, as seems probable, his premature death was due to hardships and exposure during those travels, his name may be added to the list of martyrs in the cause of science. Mr. Leech was elected a fellow of the Zoological Society in 1885, and was likewise a fellow of the Linnean and the Royal Geographical Societies.

THE fall of two of the stones of the outer circle of Stonehenge, on the last evening of the nineteenth century, directs attention to the necessity for at once taking steps to preserve this remarkable prehistoric monument. The stones ought to be replaced while their original positions are clearly remembered, and before public interest in their fall has subsided. An engineer, writing to the *Times*, suggests a method of undermining the stones and imbedding them in a foundation of concrete or cement. A scheme of this kind would cost comparatively little, and there should be no difficulty in obtaining funds to carry it out. At any rate, the preservation of Stonehenge ought to be given serious consideration without delay, and archaeologists should see that something is done to prevent the gradual collapse of this wonderful memorial of the past.

As already announced, a committee of the U.S. House of Representatives has decided to report in favour of the adoption of the metric system of weights and measures. Referring to this, the *Scientific American* makes the suggestion that England should join with the United States in introducing the system at the same time. Our contemporary remarks:—"The probability of the Bill's becoming a law would be greatly increased if the other great branch of the English-speaking race could be induced to make the change simultaneously with this country. The agitation in favour of the metric system is as strong, possibly stronger, in Great Britain as it is here, and in view of the close trade relations and the enormous volume of business between the two countries, it is well worth considering whether an attempt at concerted, or rather simultaneous, adoption of the metric system would not be advisable."

THE Brussels correspondent of the *Times* states that arrangements are in progress for a series of experiments in wireless telegraphy between Brussels and Antwerp, on the Guarini system. The apparatus for transmitting messages is nearly complete in both cities, and has been erected in Brussels in the Place du Congrès and at Antwerp on the tower of the well-known cathedral of Notre Dame. M. Guarini is doubtful whether local conditions will admit of direct communication, and he proposes to utilise Malines Cathedral, situated midway between the two cities, as an automatic repeating station. On the other hand, if it is found practicable, Antwerp itself will be made to serve as a repeating station for other points of the compass. The first trial is to take place on January 20.

DURING the past week the type of weather over the British Islands has entirely changed, the warm south-westerly current having given way to cold north-easterly winds, with high barometric pressure. During the latter part of last week the change of conditions caused a large amount of fog, especially over the southern parts of England, but this was quickly dispelled by a piercing N.E. gale which set in on Saturday evening, and was in turn followed by considerable falls of snow. The temperature was lowest over the midland and southern parts of the kingdom, where readings exceeding 10° below the freezing point have been recorded. This spell of wintry weather has spread over this country from the Continent, where conditions during the week have been abnormal. In Germany the thermometer has fallen below zero, and in France readings of 20° below the

freezing point have been registered. Snow has fallen in many parts, and also in Rome for the first time during the last seven years. A rise of temperature occurred over the southern portion of England on Wednesday.

IN the U.S. *Monthly Weather Review* for September last, Mr. H. M. Watts discusses what he calls the Gulf Stream myth. He points out that the mild climate of north-western Europe is not due to the Gulf Stream, but to the prevailing eastward and north-eastward drift of the atmosphere which distributes over Europe the heat conserved by the whole Atlantic Ocean north of latitude 35° (roughly). The Gulf Stream is not distinguishable in temperature or "set," the author states, from the rest of the ocean, by the time it gets east of Newfoundland; and if it were by any possibility to be diverted at the Straits of Florida, no one in England would be a whit the wiser. If the drift of the aerial currents were reversed, the Atlantic Coast States, from North Carolina to Newfoundland, would have the mildness of Bermuda, not on account of any one ocean current, but because of the conserved warmth of the ocean as a whole. As it is, the August hot waves, the mild spells in January and February, and other anomalies which seem at times to reverse the seasons on the eastern coasts of the United States, are due, not to any shifting of the Gulf Stream, but to the intrusion of the anticyclone (or system of high barometric pressure) from the Atlantic Ocean.

WE have received the report of the Economical Society of Livonia, containing the results of the rainfall and air-temperature observations made at some 150 stations in the Russian Baltic provinces during the year 1899. The stations are maintained partly by the Central Physical Observatory of St. Petersburg and partly by the Ministry of Marine, and, to a considerable extent, the monthly and yearly results are included in the publications of the Central Observatory. The Society does good work in establishing a close network of stations, and in publishing the results in more detail than is generally done in the official year-books. The observations have been utilised during the time of harvest by the issue of special forecasts to agriculturists, and such a system is of great utility in endeavouring to discover the various anomalies that are found to exist in the distribution of rainfall, which cannot always be explained by the geographical conditions of the stations.

AN interesting contribution to our knowledge of the laws of vortex motion is given by Herr K. Żorawski in the *Bulletin* of the Cracow Academy, viii., 1900. The deduction of these laws from the equations of hydrodynamics, subject to certain physical assumptions, is mainly due to Helmholtz; the present paper deals with the converse problem of finding the mathematical conditions which must be satisfied by the velocity components in order that the so-called "circulation theorems" may hold good.

UNDER the title of "The transfigurations of a Science," Prof. Gino Loria has published a reprint of his academical address to the University of Genoa, dealing with the history of mathematics. It traces the gradual progress of mathematics from the ancient Greeks to the present day; the introduction of algebra into Europe, the fusion of the two branches of mathematics, algebra and geometry by the creation of analytical geometry; and, lastly, the rising up of the science of non-Euclidian geometry.

UNDER the name of "The Astronomical Demonstrator," Mr. W. H. Adams, of Wandsworth, has recently arranged a series of lecture-models intended to provide a teacher with the means of quickly illustrating, in a practical manner, most of the dispositions and phenomena of the solar system. A large sheet of cardboard or other material is provided with diagrams of the orbits of the planets, &c., and small models of the sun, earth,

moon and planets, with weighted bases and movable axes, are placed in their proper positions on their various orbits as determined from an ephemeris. In addition, there are various appendages capable of attachment to the objects for the illustration of special phenomena, such as eclipses of the sun and moon. The apparatus should be specially useful in classes where it is possible to allow the pupils to individually work exercises in the proper grouping of the planets, as in that way many of the definitions connected with orbital motion are presented in a very simple manner.

A VALUABLE contribution to the climatology of Africa appears in the *Mitteilungen aus den deutschen Schutzgebieten* in the form of records obtained from self-registering meteorological instruments in German East Africa. The period covered extends from the end of 1895 to the end of 1899, and the records, more or less complete in each case, are from the seven stations Dar-es-Salam, Tanga, Kwai, Tosamaganga, Tabora, Kibosho and Muansa.

THE *Zeitschrift der Gesellschaft für Erdkunde zu Berlin* contains an important article on the question of glaciation in the Central Balkans by Prof. W. Götz. The author's investigations support the conclusions that (1) after diluvial deposits had been laid down in the mountain valleys, the erosive action of the streams greatly increased, probably on account of sinking of the lower courses; (2) the apparent indications of glacial action met with are false; and (3) traces of glacial phenomena are absent where they ought to be most marked, at the higher elevations in regions suited to the formation of snow-fields.

THE Oregon mountaineering club, which has adopted the title *Mazama*, the Indian name of the mountain goat, has just issued the first number of the second volume, or rather series, of its journal. The number is devoted to Mount Rainier, and includes an account of the expedition of the club to that mountain in 1897. Observations of the mercurial barometer, made at the summit by Prof. Edgar McClure, who lost his life by a fall during the descent, have been reduced by Prof. E. H. M'Allister, and give the height of Mount Rainier at 14,528 feet, compared with 14,519 feet obtained by the United States Geological Survey.

IN an article on the Phyllades of the Ardennes compared with the Slatess of North Wales (Part ii. *Proc. Liverpool Geol. Soc.*, 1900), Mr. T. Mellard Reade and Mr. P. Holland state their conclusions that slaty cleavage is not alone a mechanical effect, but that it is mainly due to a development of flaky minerals in conjunction with the shearing forces to which the slate rock has undoubtedly been subjected.

"THE Geology of the Country between Atherstone and Charnwood Forest" is the title of a geological survey memoir by Mr. C. Fox-Strangways, just published in explanation of the map No. 155. The pictorial frontispiece illustrates the Hanging Rocks at Woodhouse Eaves, one of those crags of sharply pointed rocks which characterise Charnwood Forest, and in some instances suggest resemblances to the kopjes of British South Africa. These ancient pre-Cambrian rocks have been studied in detail by Prof. W. W. Watts, who contributes a chapter on the subject confirming the main results attained by Prof. Ronney and the Rev. E. Hill, and adding much in the determination of an orderly succession. Mr. Strangways contributes chapters on the Stockingford Shales of Cambrian age, on the Coal-measures of parts of Warwickshire and Leicestershire, with illustrative sections and records of borings and sinkings, and on the newer deposits, Permian and Trias, Glacial and Recent. In an Appendix there is a list of works on the geology of Leicestershire, which has been compiled by Mr. Strangways with the aid of Mr. Whitaker.

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To the *Proceedings* of the Philadelphia Academy (1900, pp. 568-581) Mr. H. A. Pilsbry has recently contributed a suggestive paper on the genesis of the faunas of the middle Pacific islands. The land mollusca of these islands form the basis of the discussion, which is formulated by the author in the following words:—"Are the Mid-Pacific snail faunas witnesses to the existence of a palæozoic or early mesozoic land mass, probably continental in proportions, and peopled by representatives of nearly all land-snail groups then existing?" A further question is whether this hypothetical continent was connected at a comparatively recent epoch with Chili. It is concluded that the evidence in favour of the existence of such a continent (upon the sunken heights of which the present island-masses, volcanic or coral, have been superimposed) is overwhelming. But both the marine and terrestrial molluscs lend no countenance that this continent was ever connected with America. It is somewhat curious that the author makes no reference to the Gondwana flora, which has been considered by Blanford and others as affording evidence of a girdle of land round much of the globe in low latitudes in palæozoic or mesozoic times.

THE fourth part of vol. lxviii. of the *Zeitschrift für wissenschaftliche Zoologie* contains an important paper by Herr Antonin Stöck on the power of assimilating and producing hydrocarbons by amœba-like organisms, such as *Pelomyxa palustris*. In spite of certain experiments that have had a negative result, the author is of opinion that such a power undoubtedly exists in the species mentioned, as well as in other members of the group, and he refers to the detection by Reinke and Rodewald of glycogen in the tissues of *Aethalium septicum*. To the same issue Herr W. Redikorzew contributes the results of his investigations into the structure of the ocelli of insects and other arthropods. The ocelli are originally formed by a depression in the thick hypodermal layer, in which one of two subsequent modes of development takes place.

PARTS x to xix of "Papers from the Harriman Alaska Expedition," all of which are devoted to the entomological results (including Arachnids), have been received. Mr. N. Banks deals with the Neuropteroid insects and Arachnida, Mr. H. G. Dyar with the Lepidoptera, Mr. O. Heidemann with the Heteroptera, Mr. T. Kincaid with the Sphegoids and Vespoidea, while Mr. A. N. Caudell is responsible for the Orthoptera, Mr. T. Pergande for the Aphididae and Formicidae, and Mr. E. A. Schwarz for the Coleoptera and the Psyllidae. The beetles are the group which had been most worked previously; only a single species of Orthoptera was obtained; but in most of the other groups a considerable number of new types were collected.

THE January number of the *Journal of Conchology* contains a list of British Marine Molluscs and Brachiopods, prepared by a committee of the Conchological Society. This is a good start for the new century, the nomenclature having been thoroughly revised and brought up to date. Some of the names, such as *Neptunea antiqua* for the red whelk, may be unfamiliar and strange, but it is to be hoped that in future they may, for the sake of uniformity, be adopted by all.

ADDITIONS to the British insect fauna continue to be made from time to time, the *Entomologist's Monthly Magazine* for January recording two kinds of saw-flies as new to our islands, while it also gives a list of species of beetles added to the list during 1899 and 1900.

REVIEWING the recent report on the working and results of the Woburn Experimental Fruit Farm, Dr. Maxwell Masters suggested (p. 178) that it would be an advantage to make a corresponding series of growths on poor soil, so as to afford a basis for comparison. We now learn that such a control station has been established already on a relatively barren soil; but the

installation is too recent to allow any definite inferences yet to be drawn.

MESSRS. W. N. BRUNTON AND SON, Musselburgh, N.B., have issued a new list of special brands of electrical resistance material. Taking the electrical resistance of copper as unity, the resistances of wires supplied by the firm are given as follows: Pure Swedish iron, 6; soft steel, 8; Edina steel, 12; German silver (19 per cent.), 17; German silver (28 per cent.), 26; Ferno, 30; and Beacon, 51.

MESSRS. CHAPMAN AND HALL have published a second edition, with appendix, of a book by Mr. F. Hovenden, bearing for its title the interrogations "What is Life? or Where are We? What are We? Whence did we come? and Whither do we Go?" Mr. Hovenden explains how he is able to answer these questions and revise the accepted opinions of men of science.

A SHORT account of the scientific work accomplished by the Tasmanian Society and the Royal Society of Tasmania, from the year 1840 to the close of 1900, has been prepared by Mr. Alex. Morton, the secretary of the latter society. The total number of scientific papers published by this society during the period mentioned, and not including small papers on various subjects, is 606. Of these no less than 132 are devoted to geology, paleontology and mineralogy, 85 to botany, 56 to astronomy and meteorology, and 53 to fishes. Mr. Morton's record is an interesting history of scientific activity in Tasmania, and it is a good testimonial to the valuable work of the Royal Society at Hobart.

THE additions to the Zoological Society's Gardens during the past week include a Macaque Monkey (*Macacus cynomolgus*) from the Andaman Islands, presented by Lieut.-Colonel G. M. Prichard, I.S.C.; a Campbell's Monkey (*Cercopithecus campbelli*) from West Africa, presented by Mr. W. R. Fowler; a Suricate (*Suricata tetradactyla*) from South Africa, presented by Mr. E. Thomas; seven Verreaux's Guinea Fowls (*Guttera edouardi*) from East Africa, presented by Mr. J. F. Walker; two Crested Pigeons (*Ocyphaps lophotes*) from Australia, presented by Mr. W. L. Prentice; two Blue-winged Sivas (*Siva cyanoptera*), a Silver-eared Mesia (*Mesia argenteauris*), a White-capped Redstart (*Chimarrhornis leucocephalus*), a Rufous-bellied Miltava (*Miltava sundara*), a Burmese Roller (*Coracias affinis*) from India, presented by Mr. E. W. Harper; three Painted Snipe (*Rhynchoea capensis*) from India, presented by Mr. Frank Finn; a Heron (*Ardea cinerea*) from South Africa, presented by Mr. J. E. Matcham; three Delalande's Lizards (*Nucras delalandi*), a Hispid Lizard (*Agama hispida*), a Three-streaked Skink (*Mabuya trivittata*), a Rufescent Snake (*Leptodira hotambacia*), a Lineated Snake (*Boodon lineatus*) from South Africa, presented by Mr. J. D. Waley; two Green Monkeys (*Cercopithecus callitrichus*) from West Africa, three Viscachas (*Lagostomus trichodactylus*) from Buenos Ayres, three Open-bills (*Anastomus oscitans*), four Starred Tortoises (*Testudo elegans*) from India, a Blue-crowned Hanging Parrakeet (*Loriculus galgulus*) from Malacca, ten Small-scaled Mastigures (*Uromastix microlepis*) from Persia, a Common Toad (*Bufo vulgaris*), European, deposited.

OUR ASTRONOMICAL COLUMN.

ELEMENTS OF COMET 1900 (c).—A circular from the Centralstelle at Kiel gives the elements of this comet, computed by H. Kreutz and J. Möller from observations on December 24, 26 and 28, 1900.

$$\begin{aligned} T &= 1900 \text{ Dec. } 2^{\text{h}} 6^{\text{m}} 0^{\text{s}} \text{ M.T. Berlin.} \\ \omega &= 178^{\circ} 0' 8'' \\ \Omega &= 192^{\circ} 28' 3'' \\ i &= 30^{\circ} 25' 4'' \\ \log q &= 9.99184 \end{aligned} \quad \left. \begin{array}{l} \\ \\ \\ \end{array} \right\} 1900.0$$

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The brightness of the comet is slowly decreasing. The latest observation recorded is by Aitken at Lick, the position being:—

$$\begin{aligned} \text{R.A.} &= 23^{\text{h}} 23^{\text{m}} 18.5^{\text{s}} \\ \text{Decl.} &= -23^{\circ} 7' 27'' \end{aligned} \quad \left. \begin{array}{l} \\ \end{array} \right\} 1900 \text{ Dec. } 28.$$

Ephemeris for 12h. Berlin Mean Time.

1901.	R.A.	Decl.	Br.
Jan. 10	0 36 30 ...	-22° 44' 0 ...	0.68
11	41 51 ...	22 36 8 ...	
12	47 7 ...	22 28 9 ...	
13	52 20 ...	22 20 4 ...	0.60
14	0 57 29 ...	22 11 3 ...	
15	1 2 34 ...	22 1 6 ...	
16	7 36 ...	21 51 4 ...	
17	12 33 ...	-21 40 6 ...	0.53

NEW VARIABLE STARS.—Three more variables have been recorded as discovered in 1900, bringing the number for the year up to twenty-three (*Astronomische Nachrichten*, Bd. 154, No. 3678).

21.1900, *Monocerotis*.—Prof. W. Ceraski, writing from Moscow, announces the variability of the star situated at

$$\begin{aligned} \text{R.A.} &= 6^{\text{h}} 48^{\text{m}} 49.13^{\text{s}} \quad \dots \quad +11^{\circ} 25' 37.0'' \quad (1855.0) \\ \text{Decl.} &= 6^{\text{h}} 51^{\text{m}} 19.24^{\text{s}} \quad \dots \quad +11^{\circ} 22' 21.6'' \quad (1900.0) \end{aligned}$$

The brightness varies from 8.8 to 11.5 magnitude.

22.1900, *Cygni*.—Mr. A. Stanley Williams, from examination of photographs by Prof. Max Wolf and himself, has detected variability in the star B D. +42° 39' 35", having the position

$$\begin{aligned} \text{R.A.} &= 20^{\text{h}} 54^{\text{m}} 45.9^{\text{s}} \\ \text{Decl.} &= +42^{\circ} 2' 0'' \end{aligned} \quad \left. \begin{array}{l} \\ \end{array} \right\} (1855.0).$$

The magnitude varies from 9.5 to 11.0. A table of observations from 1891 is given, from which the following elements for the variable are determined:—

$$\text{Epoch of Max.} = 1900 \text{ Feb. } 5 + 13\text{d. } 315 \text{ E,}$$

so that future maxima may be expected on Jan. 17 and 30, 1901. The writer draws attention to the fact that the rise from minimum to maximum is very rapid, a phenomenon previously recorded by Dr. Hartwig in the variable 2.1900 Cygni.

23.1900, *Andromedae*.—Dr. T. D. Anderson draws attention to the variability of the star B.D. +38° 31', the place of which is

$$\begin{aligned} \text{R.A.} &= 1^{\text{h}} 31^{\text{m}} 7.9^{\text{s}} \\ \text{Decl.} &= +38^{\circ} 36' 3'' \end{aligned} \quad \left. \begin{array}{l} \\ \end{array} \right\} (1855.0).$$

The variation is from magnitude 9.8 (1900 Oct. 27) to 10.7 (1900 Dec. 15).

VISIBLE SPECTRUM OF NOVA AQUILAE.—Prof. W. W. Campbell, during the autumn of 1900, made an examination of the spectrum of the new star in Aquila, which had been discovered by Mrs. Fleming in July, 1900. A 60" simple prism spectroscope was used in connection with the 36 inch Lick refractor. Prof. Campbell confirms the Harvard College observations as to the spectrum being nebular, but mentions differences between it and that of Nova Aurigæ in 1892 which are of importance. The visible spectrum is stated to consist of extremely faint continuous light in the green, and of three bright bands in the positions of the three nebular lines. The relative intensities of the three bands were in agreement with the corresponding intensities in actual nebular spectra. In addition, however, the bands were *not monochromatic*, but on the contrary were *very broad*, perhaps fully twice as broad as in the nebular spectrum of Nova Aurigæ in 1892.

NORMAL POSITIONS OF CERES.—Prof. G. W. Hill has collected the available observations of the minor planet Ceres for the past century during which it has been known, and formed normals from as many as were suitable. The computed normal positions are given for seventy-five years, the dates being for Greenwich mean noon, the values of the co-ordinates being *true*, not apparent. The planet has been observed at every opposition since its discovery, but on two occasions the reductions are discordant (*Astronomical Journal*, No. 487, vol. xxi., pp. 51-54).